## DESCRIPTION OF OPERATIONS

### Shipboard Research:

For the sixth consecutive year, the cruise was conducted aboard the chartered Russian research vessel R/V *Yuzhmorgeologiya*.

Itinerary

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| Leg I: | Depart Punta Arenas | 11 January 2001 |
| | Transfer personnel and supplies to Cape Shirreff | 14 January |
| | Calibrate in Admiralty Bay, King George Island | 15 January |
| | Large-area survey (Survey A) | 16 January- 01 February |
| | Recover personnel from Cape Shirreff | 02 February |
| | Arrive Punta Arenas | 05 February |
| Leg II: | Depart Punta Arenas | 08 February |
| | Transfer personnel and supplies to Cape Shirreff | 11 February |
| | Large-area survey (Survey D) | 12-28 February |
| | Close Cape Shirreff | 01 March |
| | Close Copacabana and Calibrate in Admiralty Bay | 02 March |
| | Arrive Punta Arenas | 05 March |
| Leg III: | Depart Punta Arenas | 09 March |
| | Bottom trawl survey, bottom typing and CTDs | 12-31 March |
| | Arrive Punta Arenas | 03 April |

**Leg I**

1. The R/V *Yuzhmorgeologiya* departed Punta Arenas, Chile en route to Livingston Island to deliver supplies and personnel to the field camp.

2. The acoustic transducers were calibrated in Admiralty Bay, King George Island. The transducers, operating at 38 kilohertz (kHz), 120kHz, and 200kHz, were hull-mounted and down-looking. Standard spheres were positioned beneath the transducers via outriggers and monofilament line. The beam patterns were mapped, and system gains were determined.

3. Survey components included acoustic mapping of zooplankton, direct sampling of zooplankton, Antarctic krill demographics, physical oceanography and phytoplankton. A large-area survey of 101 Conductivity-Temperature-Depth (CTD) and net sampling stations, separated by acoustic transects, was conducted in the vicinity of Elephant, Clarence, King George, and Livingston Islands (Survey A, Figure 2). Stations were located in three areas: stations to the north of Livingston and King George Islands are designated the "West Area," those to the south of King George Island are designated the "South Area," and those around Elephant Island are called the "Elephant Island Area". Acoustic transects were conducted at 10 knots, using hull-mounted 38kHz, 120kHz, and 200kHz down-looking transducers. Operations at each station included: (a) vertical profiles of temperature, salinity, and oxygen, and measurements of chlorophyll at 5 meters depth; and (b) deployment of an IKMT to obtain samples of zooplankton and micronekton.

4. Optical oceanographic measurements were conducted, which included weekly SeaWiFS satellite images of surface chlorophyll distributions and *in-situ* light spectra profiles.

5. Continuous environmental data were collected throughout Leg I, which included measurements of ship's position, sea surface temperature and salinity, fluorescence, air temperature, barometric pressure, relative humidity, wind speed, and wind direction.

6. The ship visited the Cape Shirreff and the Copacabana field camps to deliver provisions and supplies in the beginning of Leg I.

7. The ship recovered personnel from Cape Shirreff at the end of Leg I.

**Leg II**

1. The R/V *Yuzhmorgeologiya* departed Punta Arenas, Chile via the eastern end of the Strait of Magellan and arrived at Cape Shirreff to deliver supplies and personnel to the field camp.

2. A large-area survey of 99 Conductivity-Temperature-Depth (CTD) and net sampling stations, separated by acoustic transects, was conducted in the vicinity of Elephant, Clarence, King George, and Livingston Islands (Survey D, Figure 2). Stations were located in three areas: stations to the north of Livingston and King George Islands are designated the "West Area," those to the south of King George Island are designated the "South Area," and those around Elephant Island are called the "Elephant Island Area". Acoustic transects were conducted at 10 knots, using hull-mounted 38kHz, 120kHz, and 200kHz down-looking transducers. Operations at each station included: (a) vertical profiles of temperature, salinity, and oxygen, and measurements of chlorophyll at 5 meters depth; and (b) deployment of an IKMT to obtain samples of zooplankton and micronekton.

3. Optical oceanographic measurements were conducted, which included weekly SeaWiFS satellite images of surface chlorophyll distributions and *in-situ* light spectra profiles.

4. As on Leg I, continuous environmental data were collected throughout Leg II.

5. At the end of Leg II, the ship then transited to Cape Shirreff to embark personnel and close the field camp.

6. Following the completion of the close of Cape Shirreff, the acoustic transducers were calibrated in Ezcurra Inlet, Admiralty Bay, and King George Island. The Copacabana field camp was closed and field personnel were retrieved.

**Leg III**

1. The R/V *Yuzhmorgeologiya* departed Punta Arenas, Chile via the eastern end of the Straits of Magellan. After transiting across the Drake Passage, the ship arrived at the South Shetland Islands for the first trawl station.

2. A total of 71 hauls were conducted within the 500m isobath of the South Shetland Islands (See Figure 5.1 in Section 5). The trawl gear consisted of a two-warp/four panel bottom trawl and a third-wire linked net sonde.

3. Other scientific operations included continuous acoustic data collection, bottom type habitat characterization using underwater video and camera mounted grab sampler, 26 days of continuous underway measurements of meteorological and sea surface conditions, and CTD casts.

4. At the end of Leg III, operations ceased and the R/V *Yuzhmorgeologiya* transited across the Drake Passage to the Straits of Magellan en route to Punta Arenas, Chile.

**Land-based Research:**

Cape Shirreff

1. A four-person field team (M. Goebel, M. Taft, I. Saxer and B. Pister) arrived at Cape Shirreff, Livingston Island, on 16 November 2000 via the R/V *Lawrence M. Gould*. Equipment and provisions were also transferred from the R/V *Lawrence M. Gould* to Cape Shirreff.

2. Two additional personnel (W. Trivelpiece and B. Parker), along with supplies and equipment, arrived at Cape Shirreff via the R/V *Yuzhmorgeologiya* 14 January 2001. R. Holt arrived at Cape Shirreff via the R/V *Yuzhmorgeologiya* on 11 February 2001.

3. Camp maintenance at Cape Shirreff included exterior deck construction of the emergency shelter/bird observation blind.

4. The annual census of active gentoo penguin nests was conducted on 27 November 2000, and a similar census of chinstrap penguin nests was completed on 3 and 4 December 2000. Reproductive success was studied by following a sample of 100 chinstrap penguin pairs and 50 gentoo penguin pairs from egg laying to crèche formation.

5. Radio transmitters were attached to 19 chinstrap penguins between 4-6 January 2001; these instruments were used to determine foraging trip duration during the chick-rearing phase. All data were received and stored by a remote field computer set up at the bird observation blind.

6. Four satellite-linked transmitters were deployed on adult chinstrap penguins on 27 November 2000 to determine foraging location of adult females following clutch completion. These satellite tags were redeployed on 4 adult birds in late January and early February to coincide with the time when the AMLR 2001 marine survey was adjacent to Cape Shirreff at the end of Leg I and beginning of Leg II.

7. Diet studies of chinstrap and gentoo penguins during the chick-rearing phase were initiated on 7 January 2001 and continued through 11 February 2001. Chinstrap and gentoo adult penguins were captured upon returning from foraging trips, and their stomach contents were removed by lavaging.

8. A count of all gentoo penguin chicks was conducted on 25 January 2001, and for chinstrap penguin chicks on 6 February 2001. Fledging weights of chinstrap penguin chicks were collected from 20-26 February 2001. Two hundred gentoo penguin chicks were also weighed on 10 February 2001.

9. One thousand chinstrap penguin chicks and 200 gentoo penguin chicks were banded for future demographic studies.

10. Reproductive studies of brown skuas and kelp gulls were conducted through out the season at all nesting sites around the Cape.

11. Time-depth recorders (TDRs) were deployed on 9 chinstrap penguins for 10-12 days in late January to coincide with the marine sampling offshore at Cape Shirreff at the end of Leg I and beginning of Leg II.

12. Antarctic fur seal pups and female fur seals were counted at four main breeding beaches every other day from 18 November 2000 through 10 January 2001.

13. Attendance behavior of 29 lactating female Antarctic fur seals was measured using radio transmitters. Females and their pups were captured, weighed, and measured from 5-12 December 2000.

14. U.S. researchers assisted Chilean scientists in collecting data on Antarctic fur seal pup growth. Measurements of mass, length, and girth for 100 pups began on 16 December 2000 and continued every two weeks until 14 February 2001.

15. Information on Antarctic fur seal diet was collected using three different methods: scat collection, enemas of captured animals, and fatty-acid signature analyses of milk.

16. Thirty-seven Antarctic fur seals were instrumented with time-depth recorders (TDRs) for diving behavior studies.

17. Twenty-five Antarctic fur seal females were instrumented with ARGOS satellite-linked transmitters for studies of at-sea foraging locations from 23 December 2000 to 17 February 2001.

18. Five hundred Antarctic fur seal pups were tagged at Cape Shirreff by U.S. and Chilean researchers for future demography studies.

19. A weather data recorder (Davis Instruments, Inc.) was set up at Cape Shirreff for wind speed, wind direction, barometric pressure, temperature, humidity, and rainfall.

20. A single post-canine tooth was extracted from 60-tagged female fur seals for aging and demography studies. Studies of the effects of tooth extraction on attendance and foraging behavior were initiated.

21. One team member (M. Goebel) left Cape Shirreff via the R/V *Yuzhmorgeologiya* on 2 February 2001.

22. The Cape Shirreff field camp was closed for the season on 28 February 2001; all U.S. personnel (R. Holt, W. Trivelpiece, B. Parker, M. Taft, I. Saxer and B. Pister) and Chilean personnel, garbage, and equipment were retrieved by the R/V *Yuzhmorgeologiya*.

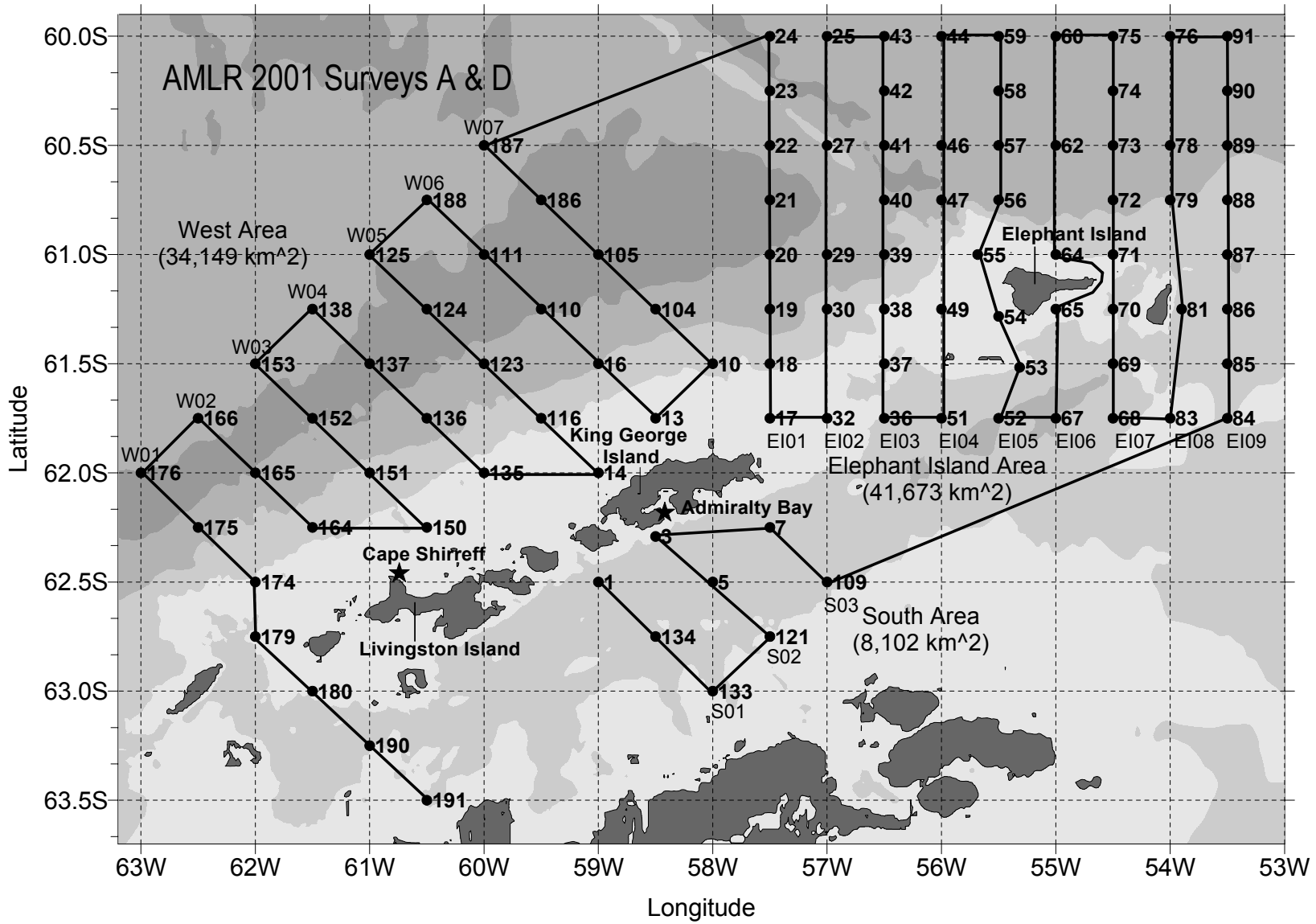


Figure 2. The large-area survey for AMLR 2001 (Survey A & D) in the vicinity of Elephant, Clarence, King George and Livingston Islands. Stations located to the north of Livingston and King George Islands are designated the "West Area", those to the south of King George Island are designated the "South Area" and those around Elephant Island are designated the "Elephant Island Area". Depth shading is 0-500m, 500-2000m, 2000-4000m and greater than 4000m.